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Integrating Biomedical And Clinical Pedagogical Approaches Of Ayurveda In Competency Based Medical Education

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ABSTRACT

Background: Ayurveda established foundational frameworks for formal medical education millennia ago through its classical treatises, collectively known as the Brihatrayi. While India's National Education Policy (NEP) 2020 advocates for the integration of Indian Knowledge Systems (IKS) into mainstream curricula, a standardized pedagogical model remains absent. Modern biomedical education currently relies predominantly on Western theoretical lenses, marginalizing these sophisticated indigenous instructional frameworks.

Material and Methods: This qualitative scoping review employed a comparative textual analysis of primary classical texts (Charaka Samhita, Sushruta Samhita, and Ashtanga Samgraha) alongside modern educational psychology and public policy documents. Data was systematically extracted from specific chapters delineating teaching methodologies, dialectic reasoning, and clinical skill acquisition.

Results: The analysis reveals a comprehensive, systems-based educational model highly congruent with modern Competency-Based Medical Education (CBME). The foundational structural trinity—Shastra (subject matter), Acharya (educator), and Shishya (learner)—is strictly evaluated for academic and behavioral prerequisites. Furthermore, ancient functional pedagogies directly parallel contemporary methods: Tadvidya Sambhasha mirrors problem-based and dialectic learning, Yogya Vidhi correlates with simulation-based psychomotor training, and the Guru-Shishya model reflects immersive workplace-based learning.

Conclusion: The Brihatrayi offers a robust, scientific, and culturally grounded instructional framework structurally adaptable to modern medical curricula. Formal recognition and integration of these indigenous pedagogical constructs support the NEP 2020 vision, serving to decolonize educational frameworks while cultivating clinicians endowed with both advanced technical dexterity and profound ethical integrity.

Keywords: Adhyayan, Adhyapana vidhi, Biomedical and Health Education in Indian Knowledge Systems, Ayurveda Pedagogy, Clinical Pedagogy

INTRODUCTION

Ayurveda is a comprehensive indigenous health system that has been instrumental in the prevention and management of human disease for millennia. Often regarded as the mother of all health sciences, Ayurveda established the foundational framework for formal medical education long before the emergence of modern systems. The classical treatises comprehensively delineate pedagogical principles encompassing biomedicine, phytomedicine, surgical techniques, holistic well-being, and community health.The structural basis of Ayurvedic medical pedagogy is primarily embedded within its three major classical texts, collectively known as the Brihatrayi: the Charaka Samhita, Sushruta Samhita, and Ashtanga Samgraha. These foundational texts dedicate entire chapters to sophisticated educational methodologies, detailing the systematic creation, dissemination, and acquisition of medical knowledge. The core instructional framework is categorized into Adhyayana (focused study), Adhyapana Vidhi (instructional methodologies), and Tadvidya Sambhasha (scholarly discourse and symposia) [1]. Notably, these ancient paradigms share significant parallels with contemporary global medical curricula, underscoring their enduring validity and the contextual relevance of Ayurveda-based pedagogical elements within modern medical education [2]. Recently, India's National Education Policy (NEP) 2020 has advocated for the constructive integration of Indian Knowledge Systems (IKS) into mainstream education, including biomedicine. However, a significant implementation challenge persists: the absence of a standardized pedagogical framework required to effectively translate these indigenous concepts into modern academic

curricula[3]. Historically, modern biomedical education has been conceptualized and evaluated predominantly through a Western theoretical lens, thereby marginalizing the rich instructional frameworks indigenous to the Indian subcontinent.

Addressing this epistemological gap, this study asserts that the theoretical constructs elucidated in the Brihatrayi offer a robust and highly adaptable methodology for contemporary biomedical education. Rather than viewing modern medical instruction solely from the perspective of Western educational theorists, this paper illuminates the advanced instructional methodologies inherent in classical Ayurvedic texts. Ultimately, this research argues for the formal recognition of these classical pedagogical concepts as a vital component of global medical educational heritage, demonstrating their philosophical depth and practical applicability in modern medical curricula..

RESEARCH OBJECTIVES:

- To systematically evaluate the medical pedagogical frameworks elucidated in the *Brihatrayi* (*Charak Samhita, Sushruta Samhita,* and *Ashtanga Samgraha*) and establish their structural applicability and relevance within contemporary biomedical education.
- To develop a standardized pedagogical framework derived from Ayurvedic classical treatises that can be integrated into the broader Indian Knowledge System (IKS) for mainstream academic application especially in medical and health education curricula.
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METHODOLOGY

Methodology: This study is a critical literature review employing a qualitative, descriptive methodology alongside comparative textual analysis. Primary sources include the *Brihatrayi (Charaka Samhita, Sushruta Samhita, and Ashtanga Samgraha)*. Secondary sources comprise textbooks, scholarly articles on educational and general psychology, and public policy documents pertaining to IKS and NEP 2020. Data was extracted from Sanskrit shlokas available in recognized texts and online platforms.

Inclusion Criteria: The study includes only those chapters and shlokas from the Samhitas and their commentaries that explicitly delineate learning and teaching methodologies. These include: *Arthedashamahamooliya and Rogabhishagjitiya Vimana (Charaka Samhita); Shishyopanayaniya, Adhyayana Sampradayaniya, Prabhashaniya, and Yogyasutriya (Sushruta Samhita); and Shishyopanayaniya (Ashtanga Samgraha).*

Exclusion Criteria: Chapters that do not delineate pedagogical approaches were excluded.

In the subsequent step, the extracted data was analyzed thematically. As a preliminary study, a narrative synthesis was conducted following standard scoping review protocols for traditional medicine frameworks [4], with the findings presented as key thematic areas in the Results section.

FINDINGS AND RESULTS:

1. Definition of Education and Key Elements of Education-

Ayur Vidya- Biomedicine or Ayurveda is defined as Science of life in *Arthedashamahamooliya* chapter of *Sutrasthana* section of *Charak Samhita*. Nature and scope of the discipline is defined in terms of optimal functioning of the body and mind energized by the stream of consciousness. Body of knowledge of health factors is referred to as *Ayurveda.* Three main methods of acquiring knowledge about Health science or Biomedicine delineated in *Charak Samhita* i.e. *Adhyayana* (Self-learning), *Adhyapana* (Instructional Methods) and *Tadvidya Sambhasha* (Didactic methodology). Purpose of Biomedical learning looks beyond the curriculum and professional goals. It is bringing positive attributes of good physician in both learner as well as educator in terms of professional competence and character building.

अध्याप्यमध्यापयन् ह्याचार्यो यथोक्तैश्चाध्यापनफलैर्योगमाप्नोत्यन्यैश्चानुक्तैः श्रेयस्करैर्गुणैः शिष्यमात्मानं च युनक्ति [6]:

According to this definition by *Acharya Charaka*: Biomedical education and health education model in Charak Samhita comprise of : building. The above *sutra /* aphorism brings forth elements of education:

1. *Adhyapayam Shishyam*- Competent Medical Learner
2. *Acharya*- Qualified and Skillful Physician Educator
3. *Adhyapana*- Methods of Fundamental and Clinical Instruction

4. *Adhyapana Phala Yoga*- Competency Development
5. *Anukta Shreyaskara Guna*- Extracurricular/ Non-Academic positive professional values and attributes of a physician.
6. *Yunkti*- Process of educational engagement between learner and educator.

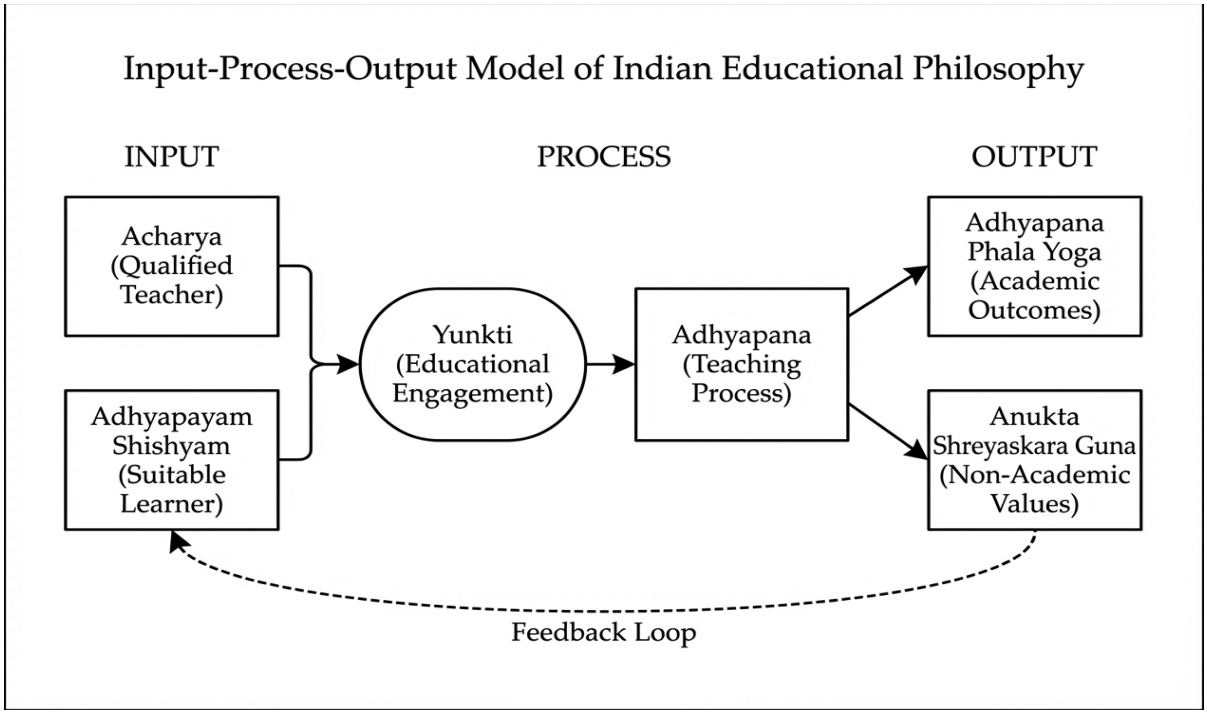

Figure 1: Systems Approach view of Ayurveda Pedagogy delineated in Samhita Texts.

2. Pedagogical Trinities in *Brihatrayi*

a. **Structural Trinity of Education**: At the core of Medical Pedagogical Philosophy of *Brihatrayi* are: *Shastra* (Curriculum/Subject matter- Human Body, Mind, Health, Health factors, Disease processes their diagnosis and their treatments), *Acharya* (Teacher/ Educator/ Mentor) and *Shishya* (Learner/ Mentee). The process of education unites these three for bringing desired transformation in abilities, skills and attitudes. All three component *Brihatrayi Samhitas* define educational processes as an interaction between these three factors.

b. **Functional Trinity of Education:** In *Charak Samhita*, three methods of knowledge creation and acquiring represented as the second trinity or functional or methodical trinity of educational framework of Ayurveda comprising of *Adhyayana* (Focused Study and learning process), *Adhyapana* (Effective Teaching Methodologies) and *Tadvidya Sambhasha* (Scholastic discussions and dialectic reasoning). These are three essential processes of pedagogical significance.

c. **Outcome Trinity of Education:** In *Shishyopanayaniya Adhyaya* chapter of *Ashtanga Samgraha, Sutrasthana*, a medical students must remain enrolled till he acquires the fundamentals of the biomedicine and all the necessary skill based clinical competencies like surgical, para-surgical, diagnostic, prognostic, skills. A biomedical student must acquire knowledge of the subject matter on three aspects: *Tantra / Paatha* (Reading and Memorizing the text, Terminological aspects of the subjects), *Tantrartha/ Avbodha* (Conceptualization and Application) and *Karmanta/ Anusthana* (Demonstration of skills and techniques- Competency development). [7-8]

3. *Trividh Pariksha*: Reciprocal Compatibility Triangle-In *Charaka Samhita*, the concept of reciprocal compatibility testing is highlighted ensuring that the curricular and extra-curricular educational objectives may be effectively achieved. Before formally engaging in the process of education i.e., learning and teaching, it is important to undergo a reciprocal screening process to ensure aptitude, attitude and systematic compatibility among the three elements of education. This includes 1. ***Shastra Pariksha* (Course selection)** i.e., screening of material/ Subject matter/ *Shastra* by the student for its learnability and practical utility, making choice of subject or course. 2. ***Acharya Pariksha* (Instructor Selection)** Screening *Guru* teaching faculty or *Gurukula* for better teacher and learner relations. 3. ***Shishya Pariksha* (Student Selection)**: Subsequently, Teacher or

Gurukula also test the students for various physical, mental, verbal, moral-ethical abilities and aptitude to undertake the rigors of educational process of the particular discipline. [9]

4. Pre-requisite Attributes of Structural Elements of Education i.e., *Shastra, Acharya& Shishya:*

In order to ensure that pedagogical processes become effective and for screening of the three structural units of educational process, pre-requisite attributes are delineated in *Vimanasthana* of *Charak Samhita* in the context of *Shastra Pariksha*, *Acharya Pariksha* and *Shishya Pariksha*. [10-19]

Table 1: Evaluation Characteristics of Structural Elements of Bio-Medical Education

Structural Element	Functional Domain / Category	Sanskrit Nomenclature	Key Attributes & Description
I. Shastra (Learning Resource / Subject Matter)	Scholastic & Academic Credibility	*Sumahad-yashasvi purusha sevitam, Apta-jana-pujitam, AarSham*	Compiled, referred, and validated by experts; rooted in the scientific and philosophical principles of the discipline.
	Cognitive & Learning Adaptability	*Trividha-shishya-buddhi-hitam*	Cognitively accessible and appropriate for students of varying capacities (low, medium, and high).
	Structural Integrity	*Swadharam, Kramagatartham*	Well-articulated content structured in a systematic sequence of aphorisms (Sutra), and commentaries (Bhashya/Sangraha).
	Literary Clarity	*Akashta-shabdam, Apagata-punarukta, Asankul prakarnam, Pushkalabhidhanam, Sangatartham*	Free from jargon, repetitive errors, and linguistic ambiguity; uses effective literary instruments to deliver precise meaning.
	Methodological Rigor	*Artha-tattva-vinishchaya-pradhanam, Asankula-prakaranam*	Deterministic in its approach and non-contradictory in its underlying themes.
	Instructional Effectiveness	*Lakshanavacc-udaharanavacca, Ashu-prabodharam, Artha Bahulam*	Highly illustrative and demonstrative; facilitates rapid comprehension, practical application, and interpretative depth.
II. Acharya (Physician Educator / Teacher)	Scholastic & Professional Attributes	*Paryavadatatvashrutam, Paridrushtakarmanah, Dakshah, Jitahasta Upakaranavantah, Prakritja, Anupskritvidya, Gyapana Samartha*	Possesses broad/deep knowledge, hands-on clinical proficiency, precision, and efficiency; acts as a strategic facilitator of knowledge creation.
	Physical Attributes	*Sarvendriya-upapannah*	Demonstrates agility across all senses, enabling accurate observation, diagnosis, and teaching.
	Management Attributes	*PratipatimAn, Vachakam*	Exhibits strategic presence of mind to adapt pedagogies to student needs; eloquent in explaining complex concepts.
	Psycho-Behavioural Attributes	*Shuchi, Dakshin, Anahamkritam, Asuyakam, Akrodhanam, Kleshashaham, Shishya Vatsalam, Arjavam*	Characterized by ethical purity, humility, patience, transparency, and a lack of jealousy/ego; treats students with deep, parental care.
III. Shishya (Medical Learner / Student)	Physical & Vocal Attributes	*Riju-chakshur-mukha-nasa..., Avyapannendriyam*	Possesses clear vocalization free from speech disorders, alongside

			optimal sensory (visual, auditory, tactile) and motor agility.
	Psycho-Behavioural Attributes	*Prashantam, Aarya Prakriti, Udaar satva, Daksha, Shuchi, Anahamkritam, Akopana, Avyasani, Guruvatsala*	Maintains a calm, focused, noble, and generous demeanor; free from addiction and greed; deeply devoted and humble toward the educator.
	Attitudinal Attributes	*Adhyayana Abhikaamita, Tatva Abhinivehsi, Tadvidy vrutti, Sarva Bhoot Hiteshi*	Displays a strong positive attitude toward learning, an inquiry-based/research aptitude, altruism, and readiness for dialectic collaboration.
	Cognitive & Intellectual Aptitude	*Jitendriya, Medhavi, Dhritimant, Smritimant, Vitarka sampanna*	Self-regulated with strong mental resilience; endowed with excellent memory, logical reasoning, and the capacity to grasp complex concepts.

Table 2: Ayurveda Based Biomedical Pedagogical Approaches

Pedagogical Approach	Sub-Components & Techniques	Description & Key Objectives
Adhyayana Vidhi(Learning Methodology)	*Upanayana Samskara*-**Induction and Initiation**	A psycho-spiritual initiation and orientation process that introduces students to ethical conduct, scholastic behavior, and professional responsibilities.
	Learning Environment	The requirement of a comfortable, clean, and undisturbed space to maintain student focus and manage classroom behavior.
	Memorization & Reflection	Continuous vocal practice, repetition, and memorization of aphorisms, paired with deep reflection on their meanings to eliminate learning fallacies.
Adhyapana Vidhi(Teaching Methodology)	Student Assessment	The initial evaluation of a prospective student's aptitude, abilities, and attitude to determine their readiness for the learning process.
	Curriculum Organization	Structuring complex texts into hierarchical, comprehensible units: Subject (Tantra), Section (Sthana), Chapter (Adhyaya), Inquiry (Prashna), Syntax (Vakya), Applicability (Vakyartha), and Critical Analysis (Arthavayava).
	Instructional Techniques	Utilizing specific methods to explain deeper meanings, including detailing (Vyaasa), condensation (Samasa), and logical framework propositions (Panchavayava).
Differentiated Instruction & Skills	Phased Recitation	Adapting instruction to cognitive abilities by breaking aphorisms into manageable parts (a small portion, one-fourth, or a complete verse) for memorization.
	Yogya Vidhi	Simulation-based learning where procedural and clinical skills are practiced on inanimate objects before real-world application.

	Knowledge Application	Utilizing theoretical constructs to articulate and apply complex ideas (Gyanabhiyogah).
	Cognitive Restructuring	Engaging with diverse perspectives to restructure concepts into new frameworks and innovate upon existing knowledge.
	Dialectic Consolidation	Clarifying doubts and solidifying understanding through structured, expert-led scholarly dialectics.
Tadvidya Sambhasha(Scholarly Discussions)	Analytical Competence	Developing verbal prowess, analytical skills, and professional persuasiveness while earning social validation and peer recognition (Yashas).

5. ***Adhyayana Antgaa-*** **Learning outcomes and Scholastic achievements** [20] **-** *Acharya Sushruta* in *Sutrasthana Adhyayana Sampraadneeya Adhyaya* highlights that on successful completion of a biomedical or clinical course, a student must exhibit the following academic milestones: a. **Conceptual clarity and Verbal Excellence –** Ability to Articulate complex concepts, theoretical frameworks of subject matter (Medical Lexicon). b. **Technical and skill Proficiency-** A student must exhibit excellent procedural knowledge after completion of course.

DISCUSSION-

The findings of this scoping review reveal that the *Brihatrayi—comprising the Charaka Samhita, Sushruta Samhita,* and *Ashtanga Samgraha* present the clinical and biomedical pedagogical views in varying degrees of details.

Charak Samhita detailed pedagogical framework in two chapters of *Sutrasthana (Arthedashmahamooliya Adhyaya*) and *Vimanasthana* (*Rogabhishagjitiya Vimana*) respectively and emphasized on the philosophy of knowledge creation, teaching, learning and dialectic excellence. While *Sushruta Samhita* detailed the pedagogical framework is discussed in four chapters of *Sutrasthana* namely *Shishyopaniya Adhyaya*, *Adhyayana Sampradayaniya*, *Prabhashaniya Adhyaya, Yogyasutriya Adhyaya,* emphasizing more on balanced pedagogical approach wherein well practiced manual skills after acquiring theoretical concepts are given equal importance. *Sushruta* pragmatic approach emphasized on achieving professional clinical as well as social competence by acquiring theoretical knowledge as well as manual skills. However, *Vagbhata* concised the pedagogical framework in one chapter i.e., *Shishyopanayaniya Adhyaya* of *Sutrasthana* in *Ashtanga Samgraha* and *Vajikarana chapter* of *Uttaratantra* in *Ashtanga Hridaya.* All the three treatises converge on structural trinity of pedagogy i.e., *Shastra* (Subject matter), *Acharya* (Educator/ Teacher) and *Shishya* (Learner/ Student) and described. As envisioned in the principles of New Education Policy 2020, purpose of education system is to develop good and contributing human beings capable of rational thought and action, possessing compassion and empathy, courage, resilience and scientific temper [22], is highly congruent with *Charaka's* view of emphasizing *Anukta Shreyaskar Guna* i.e., holistic character building of the student by effectively using learner, educator, educational methods, curricular goals and strategy of education. This idea of *Charaka's* educational framework can be well integrated in educational philosophy for contributions of Indian Educators in the domains of Indian Knowledge Systems. *Brihatrayi* pedagogical frameworks of *Adhyayana vidhi, Adhyapana Vidhi, Tadvidya Sambhasha* and *Yogya vidhi* integrates the principles of inquiry based, discovery based, discussion based, analysis based, experiential and hands on learning which fosters the idea of pedagogical shifts and restructuring of curricula as prescribed in New Educational Policy 2020. [22] This review highlights that *Tadvidya Sambhasha* or dialectic learning, Peer learning and Inquiry based learning are methods which are also used in modern clinical and biomedical pedagogy. Ayurveda pedagogical approaches also show a great regard for clinical and surgical competence-based development through *Yogya vidhi* which is a similar approach to skill simulation-based learning. *Guru-Shishya Parampara* and residential learning is very congruent to bedside learning of modern clinical education. *Patha* and *Avbodha* methods of *Adhyayana* methods shows a similarity with Flipped classrooms. Hence, many of the pedagogical approaches of Modern Biomedical Pedagogy are similar to what is described and highlighted in *Ayurveda.* Ayurveda based pedagogical methods are valid and contextual in designing modern medical pedagogical methods and aligning it with the new paradigm of Indian Knowledge Systems and New Educational Policy 2020. While the contributions of Western thinkers (such as Bloom, Piaget, or Vygotsky) are foundational to modern teacher training, the sophisticated, evidence-based contributions of Indian thinkers like *Charaka,*

Sushruta and *Vaghbhata* should not be ignored as mere historical anecdotes but must be recognized as founding father of Biomedical Educational Philosophy.

Tadvidya Sambhasha i.e., Scholarly dialogic discussions and *Yogya vidhi* i.e., experiential hands-on clinical and surgical learning are two foundations of *Ayurveda-based pedagogy* highlighted in *Brihatrayi.* [23] This Pedagogical framework of *Brihatrayi* has a potential of fulfilling the gaps in competency based medical education (CBME) framework which is globablly accepted standard of Medical Education. According to the University Grants Commission (2017), experiential learning, inquiry-based learning, case-based instruction, problem-based learning, individual/group project-based learning, discovery learning, practical work are some of the innovative techniques for effective integration of Indian Knowledge systems, [24], these approaches are integral part of pedagogical methods of *Brihatrayi* which are represented as multi-modal dialectic and experiential learning and teaching approaches. These approaches can serve as a guide for effective implementation of The New Education Policy (NEP) 2020 with special focus on the integration of IKS into mainstream biomedical education in general and Ayurveda in particular.

CONCLUSION-

To conclude, from the findings of this scoping review, it is evident that *Brihatrayi* delineates the fundamentals of pedagogical approaches of clinical Knowledge Systems which can be very well applied to provide a robust instructional design for competency based medical education as per New Educational Policy 2020 and UGC framework. The pedagogical construct comprising of Learner (*Shishya*), the Educator (*Acharya*), and the Subject Matter (*Shastra*), *Adhyapan Yukti* (*Pedagogical strategies*), *Adhyapana Phala Yoga (*Academic Outcome) and *Anukta Shreyaskar Guna* (Humanistic Outcomes) resonate the epistemological basis of educational philosophy of Ancient India. While Western pedagogical frameworks are foundational to modern biomedical training, Ayurveda-based pedagogical constructs may reposition the Indian thought of Clinical Education. This culturally grounded and scientific approach of education highlighted in *Birhatrayi* must guide the decolonization of classrooms and education and pave the way for IKS integration into modern biomedical educational paradigm of India. These indigenous pedagogical approaches strive to foster the generation of professionals who are endowed with professional integrity, technical dexterity and grounded in the ethical and cultural values of Indian Knowledge Systems...

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